



City of Rochester, New York
Mayor William A. Johnson, Jr.

2000 Water Quality Report



Hemlock Lake Survey Crew, 1894

125 Years of Pure and Wholesome Drinking Water

Rochester Water & Lighting Bureau
10 Felix St.
Rochester, N.Y.

Public Water Supply ID # NY2704518



A stream feeding Hemlock Lake.

Qn January 23, 1876, one hundred twenty-five years ago, water from Hemlock Lake first flowed into Highland Reservoir. Headlines in one local newspaper read, “**GLORY Hemlock Water At Last.**” Rochester finally had an abundant, reliable and safe supply of water.

Today, the 149 employees of the Rochester Water and Lighting Bureau are proud to follow this heritage of excellence, vision and hard work. Maintaining our abundant supply of high quality drinking water through the new millennium will require vigilance and careful planning as well as an informed and involved citizenry.

The purpose of this Annual Water Quality Report is to improve your understanding of Rochester’s drinking water and the system used to supply it. The report begins with water system highlights, followed by a brief description of the water sources, methods of treatment, and delivery system. You will learn of investments that were made to insure continued reliability of service and gain some helpful tips on how to conserve. Most importantly, you will learn specifics about the quality of your drinking water.

We hope you will find this report useful. If you have further questions or comments about your water or this report please call us at 367-3160.

—Donald Navor, *Director of Water*

2000 Highlights

- There was 100% compliance with Federal and State drinking water regulations.
- A Comprehensive Performance Evaluation by the New York State Health Department concluded that the Hemlock Filtration Plant was *"extremely well operated and maintained."*
- A special study by the United States Geological Survey concluded that pesticide concentrations in Hemlock and Canadice Lakes are *"among the lowest in any surface water in New York State."*
- The City received a **Municipal Achievement Award** from the New York Water Environment Association for watershed protection efforts.
- Hemlock Lake water made the finals in the **International Water Tasting contest** held at Berkeley Springs, West Virginia.

Our Dedication to Safe Drinking Water Begins at the Source.

For the past 125 years, Rochester has relied principally upon its upland watershed system (Hemlock and Canadice Lakes) for its drinking water supply. These lakes lie in the hills of Livingston and Ontario counties, about 30 miles south of the city. The City's ownership of a large portion (20%) of the 60-square-mile watershed, including the lakes and property surrounding the shorelines of both lakes, helps protect the quality of your drinking water. In addition, a variety of City initiatives helps protect the lakes from potential sources of contamination on non-city-owned property in the watershed.

Each year, thousands of outdoor enthusiasts who visit the watershed gain a first-hand appreciation for this unique resource through activities such as hiking, fishing, hunting, and bird watching. If you wish to visit, please be aware that you will first need to obtain a free visitor permit, available on-site. You can learn more about watershed recreation and the permit system, and even download a permit, at:

www.cityofrochester.gov/watershedpermit.htm

Treatment Processes Clean and Disinfect Your Water.

The City also supplies some City customers with Lake Ontario water that is purchased from the Monroe County Water Authority (MCWA). That water is treated at MCWA's Shoremont Filtration Plant located near the lake on Dewey Avenue.

The City's Hemlock Filtration Plant and MCWA's Shoremont Plant both employ a three-step treatment process. During the first step, chemicals called coagulants (primarily aluminum sulfate compounds) are added to the untreated water. This causes particles in the water (e.g., algae, bacteria, silt) to clump together into larger particles called "floc." In the second step, these floc particles are filtered out by passing the water through layered beds of sand and ground-up



The highly automated treatment process is under 24-hour control of licensed water plant operators.

coal (granular activated charcoal is used at the MCWA plant). In the final step, chlorine is carefully added to disinfect the water to make sure it is free of harmful microorganisms. Fluoride is also added to help prevent tooth decay. Hemlock water is seasonally adjusted for pH.

During 2000, both the City and MCWA treatment plants produced drinking water that was considerably better in quality than the health regulations required. One example was the turbidity (clarity) of filtered water. Whereas health standards required that treated water turbidity be less than 0.5 units 95 percent of the time, the turbidity of water produced at both treatment plants was less than 0.25 units 95 percent of the time.

We Focus on Quality Until the Water Flows From Your Tap.

Water treated at the Hemlock Filtration Plant flows north to the City by gravity. Along the way, water is sold (wholesale) to the Livonia, Lima, and North Bloomfield water districts. It is also sold to MCWA, who in turn supplies it to several Monroe County communities, including Honeoye Falls, Mendon, Rush, Henrietta and Brighton.

The average age of the three large pipelines that deliver Hemlock water to the City is nearly 100 years. Last year, a study was completed that sets forth a plan for upgrading this system to assure continued reliability. A \$1.8 million component of that plan was completed in 2000 when a pipe bridge that had carried the pipelines across a large creek was replaced with new segments of pipe crossing under the creek. The next major phase of pipeline modernization, scheduled for 2001, will involve replacing a critical 4100 ft. segment of pipe that joins the three conduits.



Highland Reservoir

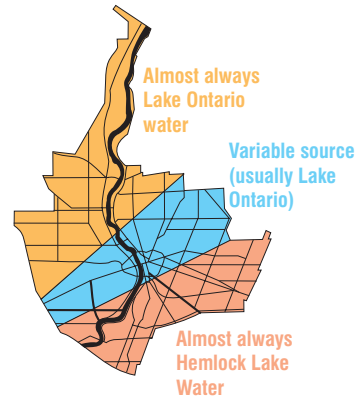
Water transmitted from Hemlock Lake to the City is stored in three large, open reservoirs located in the Town of Rush (63 MG), at Cobb's Hill (144 MG), and in Highland Park (26 MG). Water is re-disinfected with chlorine as it exits each reservoir to help insure protection against

any contaminants that may have been introduced during storage. During the summer, reservoirs are treated periodically for algae growth in order to maintain clarity and keep the water free of objectionable flavors. A planned improvement for 2001 is the remodeling of the disinfection system at Rush Reservoir. The Cobb's Hill and Highland systems were remodeled in 1998 and 1999, respectively.

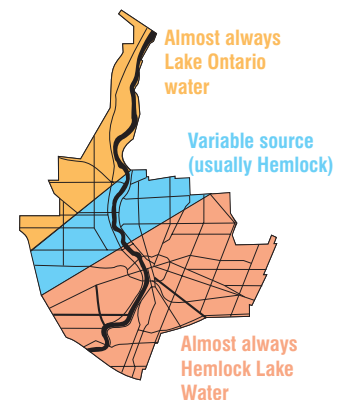
Lake Ontario water, purchased from MCWA, is introduced to the city in the area of Mt. Read Blvd. and Ridge Road. The volume of daily purchase varies

considerably, ranging from 25 to 30 million gallons per day (MGD) during certain summer days when customer demand is high, to less than 2 MGD during much of the winter. This variability means that some areas of the City may receive either Hemlock or Ontario water or a mixture, depending on the season and the prevailing level of demand. The maps below show the typical distribution patterns of the two sources of supply during summer and winter conditions.

Summer Distribution Pattern



Winter Distribution Pattern



After the water enters the City's water mains, or "distribution grid," it falls under the custody of the Bureau staff who work to maintain and improve the complex system of piping (599 miles), meters (61,649), and hydrants (7254). In 2000, we made nearly \$4 million in upgrades to the water distribution network.

Always Use Water Wisely.

Water remains an abundant, affordable commodity in our region. Despite this, City water demand has dropped substantially over the past 20 years, due to a number of factors. These include loss of water-dependent industry, decline in population, and a heightened focus on conservation. The following table presents some interesting comparative data for 1990 vs. 2000.

Statistics	1990	2000
Avg. Daily Production (MG)	36.8	35.1
Avg. Daily City Consumption (MG)	42.4	29.6
Avg. Daily Wholesale Sales (MG)	15.8	15
Avg. Daily Wholesale Purchase	20.8	9.3
Avg. Daily "Lost" Water (MG)	11.2	2.6
Cost per 1000 gals. (1st 20,000)	1.52	2.14
Population Served	231,000	219,000
Number of Retail Accounts	63,052	61,649
(MG=million gallons)		

The City's comparatively low "lost-water" rate is testimony to the Water Bureau's aggressive maintenance and repair programs. Lost water is that volume of water input into the system that cannot be accounted for by metered sales and other permitted uses. The principal cause of lost water is leakage. Some large eastern cities have lost-water rates approaching 50%.

It is important for citizens to recognize that conserving water helps conserve other resources as well, such as the electricity used to treat and pump both the water and resulting waste stream. Here are some tips to help conserve resources. 1) Fix leaky toilets and faucets promptly. 2) Replace old fixtures with newer, more efficient designs. 3) Water lawns and fill pools in the evening or early morning when water losses are minimized and when the electrical supply is least stressed. 4) Don't let hoses or faucets run unattended.

Rochester's Water Quality is Superior to Standards.

The sources of drinking water (both tap and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals, and in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activities. Contaminants that may be present in source water include: microbial contaminants, inorganic contaminants, pesticides and herbicides, organic chemical contaminants, and radioactive contaminants.

In order to ensure that tap water is safe to drink, the State and EPA prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. The regulations establish limits for contaminants in bottled water, which must provide the same protection for public health.

The roughly 50,000 tests performed on your drinking water last year showed that it was not only safe, but considerably better in quality than required by law.

Tests were performed for more than 80 biologic agents and chemical compounds that are regulated by the United States Environmental Protection Agency. Tests were done on samples collected from all stages of the system, including the source (streams and lakes), different steps in the treatment process, the storage reservoirs, and from the customer's tap. The data tables below list results only for those substances that were detected. A complete list of all substances tested can be found on the City's web site or obtained by calling our laboratory at 367-3160.



Please keep in mind that drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. Also remember that some substances, such as chlorine and fluoride, are added to the water supply for health reasons. More information about contaminants and potential health effects can be obtained by calling the EPA Safe Drinking Water Hotline at 1-800-426-4791.

Answers to Common Questions

Why is bottled water so popular?

Customers choose to drink bottled water or to further treat their tap water with what is known as a point-of-use device for different reasons. Although this is a matter of personal choice, customers should be aware that these other options are not necessarily safer than tap water. For example, studies have shown that certain point-of-use filters, if not maintained properly, can produce water of significantly lower quality than that which flows from your tap. Consumers should also be aware that bottled water is somewhat less regulated than tap water, and some have been shown to contain surprisingly high levels of certain contaminants.

Is tap water safe for everyone?

Generally, yes. There are some people with special health situations who may be more vulnerable to disease-causing microorganisms or pathogens in drinking water than the general population is. These people may wish to take special precautions. Immuno-compromised persons, such as those with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune disorders, some elderly, and infants, should seek advice from a health care provider about their drinking water. EPA/CDC guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium*, *Giardia*, and other microbial pathogens are available from the EPA Safe Drinking Water Hotline.

Is there lead in my drinking water?

Lead is not present in most source waters, including Hemlock Lake and Lake Ontario. However, minute quantities of lead can dissolve into your tap water if the water has been in prolonged contact with lead-bearing pipes and plumbing fixtures. Our customers can take comfort in knowing that our ongoing studies have shown that at-the-tap lead levels in the vast majority of Rochester households are well below the allowed limit. In fact, levels have been steadily declining since the Hemlock Filtration Plant was placed into service in 1993. Customers can further reduce their lead intake from water by simply allowing the tap to run for two minutes before use whenever the water has been stagnant in your pipes for several hours.

Why does my water sometimes taste like chlorine?

Health regulations require water suppliers to add chlorine to drinking water to help protect against dangerous microorganisms. It is widely accepted that the undesirable aspects of chlorination (e.g., formation of byproducts, taste) are greatly outweighed by the benefits of its use. Since its widespread adoption in the early 1900's, chlorine has virtually eliminated outbreaks of waterborne diseases such as cholera and typhoid fever throughout the U.S. and Canada.

Chlorine levels are carefully controlled to ensure compliance with the regulations. If you find the chlorine taste unpleasant, try filling a container with water and keeping it loosely capped in the refrigerator. The chlorine flavor will dissipate within a few hours.

Sometimes the water coming out of the tap is reddish-yellow or brown. Why?

This is usually an indication of iron or "rust" in the water. Iron is not harmful, but it can stain laundry and impart a metallic taste. If yours is the only home on your street experiencing this problem, it may be a sign that the water line running from the street to the house, or even your own household pipes or water heater, are rusting. If the problem is also experienced by neighbors, it may indicate that there is poor circulation in nearby water mains. Call our laboratory (367-3160) for assistance if this problem persists.

Would You Like More Information?

For more information about water quality or to schedule tours of treatment or reservoir facilities, call the **Hemlock Filtration Plant at 716-367-3160**. For water billing questions or other service-related issues, call the **Department of Environmental Services 24-hour Customer Service Line at 428-5990**. You can also find more water quality test data and information on Rochester's water system by doing a search for Hemlock on the City web site:

www.cityofrochester.gov

To find out more about New York State health regulations and/or local water quality issues, contact the **Monroe County Department of Health at 274-6057**.

To view the Water Quality Report of the Monroe County Water Authority, log on to:

www.MCWA.com

To find out more about water quality and Federal regulations, call the **EPA Hotline at 1-800-426-4791**, or log on to the following EPA web site:

www.epa.gov/ogwdw/

To find out more about *Cryptosporidium* and other waterborne diseases, log on to Centers for Disease Control website at:

www.cdc.gov/ncidod/diseases/crypto/sources.htm

To find out more about point-of-use water treatment devices, log on to the National Sanitation Foundation website at:

http://www.nsf.org/consumer/consumer_dwt.html

Definition of Terms

The following definitions apply to terms used in the water quality data tables below:

MCL - Maximum Contaminant Level: The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible.

MCLG - Maximum Contaminant Level Goal: The level of a contaminant in drinking water below which there is no known or expected health risk, with allowance for a margin of safety.

AL - Action Level: The concentration of a contaminant that, if exceeded, triggers treatment or other requirements that a water system must follow. For example, special treatment requirements kick in if lead levels are not below 15 µg/L at 90% or more of sites tested.

ALG – Action Level Goal: The level of a contaminant in water below which there is no known or expected health risk, with allowance for a margin of safety.

At-the-tap: Distribution system sampling location(s), such as a customer's household tap.

DS: Distribution system

Entry point: Point at which water is introduced to the system following treatment. Identified for regulatory compliance purposes.

TT - Treatment Technique: A required process intended to reduce the level of a contaminant in drinking water.

L - Liter: Volume of water slightly larger than a quart.

mg/L - Milligrams per liter: Corresponds to one part of liquid in one million parts of liquid (parts per million or ppm), or one ounce in 7350 gallons of water.

µg/L - Micrograms per liter: Corresponds to one part liquid in one billion parts liquid (parts per billion or ppb) or one ounce in 7,350,000 gallons of water.

ND - Not-Detected: Laboratory analysis indicates that the constituent is not present.

NS - No Standard: No regulatory standard in effect.

NA: Not Applicable.

NTU - Nephelometric Turbidity Unit: A measure of the clarity of water. Turbidity in excess of 5 NTU is just noticeable to the average person.

pCi/L – Picocuries per liter: A measure of the radioactivity of water.

WTP: Water treatment plant.

Detected Levels of All Substances Were Well Below Allowed Limits.

Test results below apply only to substances that were detected in the water. To see a complete list of all substances tested (detected and undetected) in 2000, visit the City website (www.cityofrochester.gov) and do a search for Hemlock, or call 367-3160.

Inorganic Substances

Below is a table of inorganic substances that were detected in water collected at the treatment plant and /or from the water distribution system (customer tap). Not all of these substances are harmful. In fact, some are purposely added during the treatment process for health benefit. The substances that are regulated because of health concerns are printed in bold.

Substance	units	MCLG	MCL	Hemlock Average (range)	Ontario Average (range)	Tested at	Likely source
Aluminum	mg/L	NA	NA	0.066 (ND–0.09)	0.076 (0.052–0.115)	WTP	Erosion of natural deposits; water filtration additive
Barium	mg/L	2	2	0.018 (0.017–0.019)	0.020 (0.017–0.022)	WTP	Erosion of natural mineral deposits
Bis (2-Ethylhexyl) Phthalate	µg/L	0	6	ND	(ND–1.2)	WTP	Production and disposal of plastics; common contaminant of lab containers
Chlorine (entry point)	mg/L	NA	4	0.87 (0.4–1.6)	1.17 (0.55–1.7)	WTP	Disinfectant additive
Chlorine (at-the-tap)	mg/L	NA	NA	0.45 (0.1–1.0)	NA	DS	Disinfectant additive
Chloride	mg/L	NA	250	(24–25)	(22–23)	WTP	Natural deposits; road salt
Chromium	µg/L	100	100	0.4	ND	WTP	Natural deposits; industrial waste
Fluoride (entry point)	mg/L	NA	2.2	0.89 (0.66–1.18)	0.98 (0.2–1.31)	WTP	Water treatment additive to promote dental health
Fluoride (at-the-tap)	mg/L	NA	2.2	0.89 (0.36–1.7)	NA	DS	Water treatment additive to promote dental health
Hardness (as CaCO ₃)	mg/L	NA	NA	86	125 (123–131)	WTP	Erosion of natural mineral deposits
	grains			5	7.3		
Manganese	µg/L	NA	300	2.7 (0.3–7)	ND	WTP	Erosion of natural mineral deposits
Nickel	µg/L	NA	100	2.4	ND	WTP	Natural mineral; industrial waste
Nitrate	mg/L	10	10	0.10 (0.02–0.19)	0.34 (0.25–0.41)	WTP	Fertilizers; erosion of natural deposits; septic tank leachate
Sodium	mg/L	NA	NA	14.3 (11.5–17)	12	WTP	Natural deposits, road salt, water treatment chemical component
Sulfate	mg/L	NA	250	19 (18–19)	28 (27–29)	WTP	Natural deposits

Copper and Lead

Neither copper nor lead were present in measurable levels in “raw” Hemlock or Lake Ontario water. However, minute quantities of these substances commonly become dissolved in the water by the time it reaches the customer’s tap as a result of the waters contact with pipes and plumbing fixtures that contain these metals. However, testing showed that this phenomenon was not a serious problem, since at-the-tap levels of copper and lead were well below allowed limits at 100% of the houses tested.

Substance	units	Regulatory Goal (ALG)	Regulatory Limit (AL)	Distribution 90% of samples had levels less than	Households % of samples Above AL	Likely source
Copper	mg/L	1.3	1.3	0.18	0	Corrosion of pipes & plumbing fixtures
Lead	µg/L	0	15	6	0	Corrosion of pipes & plumbing fixtures

Turbidity

Turbidity is a measure of the clarity of water, and it is a key parameter for judging the effectiveness of water filtration. Regulatory compliance is based on “entry point” samples taken at the water treatment plant. Turbidity of

at-the-tap samples is not as strictly regulated. It is often higher than “entry point” turbidity because of the particulate matter that is picked up during reservoir storage (algae) and during the water’s movement through the large grid of aging water mains (rust and sediments).

Substance	units	Regulatory limit	Hemlock Plant Average (maximum)	Plant Compliance w/standard.	Shoremont Plant Average (maximum)	Plant Compliance w/standard.	Likely source
Turbidity (entrypoint)	NTU	TT = 95% of samples must be < 0.5 NTU	0.10 (0.24)	100%	0.09 (0.30)	100%	Erosion of soils through runoff, algae
Turbidity (at-the-tap)	NTU	Avg. < 5 NTU	0.17 (5.4)	NA	NA	NA	Algae, corrosion of pipes

Microbiologicals (bacteria and protozoa)

Organism	units	MCLG	MCL	HEMLOCK Highest (average presence)	SUPPLY Highest (average presence)	ONTARIO Highest (average presence)	Likely source
Total Coliform bacteria	% monthly Presence	0	Violation if present in more than 5% of monthly samples	0.9 (0.3)	<0.1 (<0.1)		Naturally present in soils and in wastes of warm blooded animals
E. coli bacteria	presence	0	Violation upon any confirmed presence	No confirmed presence	No confirmed presence		Wastes of warm blooded animals & humans
Cryptosporidium	# / 100 L	NS	NS	Not Detected	Not Detected		Wastes of infected animals & humans
Giardia	# / 100 L	NS	NS	Not Detected	Not Detected		Wastes of infected animals & humans

Bacteria testing was done on approximately 200 samples collected each month from many locations throughout the distribution system. The primary test was for Total Coliform bacteria, a group of bacteria used to indicate the general sanitary conditions in a water system. Though the presence of most coliform species does not present a health concern, one member of the coliform group, *E. coli*, can be pathogenic and its confirmed presence is taken seriously.

In 1993, the State Health Department granted the City what is known as a “biofilm variance,” or exception, to the Total Coliform MCL. Biofilm refers to a layer of bacteria that can be found on almost all surfaces, including the interior of water pipes. A biofilm variance is only granted where it is demonstrated through testing that the species of total coliform bacteria recovered from the water system are harmless environmental strains originating from the pipeline biofilm. The variance does not apply to *E. coli*, or any situation where there is evidence of some external source of contamination. *Cryptosporidium* and *Giardia* are two pathogenic protozoans that can cause gastro-intestinal illness. The illness is not necessarily dangerous to a healthy person, but it can be a serious health concern for persons who have weak or damaged immune systems. Neither organism was found in samples collected from either source of supply.

Disinfection Byproducts

The substances at right form as a result of chlorine’s interaction with organic compounds that naturally occur in surface water. The disinfection process is carefully monitored and controlled to keep the levels of these substances low. Though these substances can be harmful at high levels, it is recognized that the benefits of chlorination (killing of germs) outweigh the associated risks, as long as the levels of disinfection byproduct concentrations are below the MCL.

*1998 data

Substance	units	MCLG	MCL	Hemlock Average (range)	Ontario Average (range)	Likely source
Total Trihalomethane	µg/L	NS	80	35 (20–65)	29 (13–58)	Byproduct of water chlorination
Haloaceticacids	µg/L	NS	60	27 (21–42)	10 (5–21)	Byproduct of water chlorination
Haloacetonitriles*	µg/L	NS	50	3.9 (1.5–5.3)	4.4 (3.4–5.5)	Byproduct of water chlorination
Haloketones*	µg/L	NS	50	4.5 (1.2–7.6)	1.8 (0.9–3.4)	Byproduct of water chlorination
Chloropicrin*	µg/L	NS	NS	0.5 (ND–0.8)	ND	Byproduct of water chlorination
Chloralhydrate*	µg/L	NS	NS	8.5 (1.6–13)	4.6 (1.6–12)	Byproduct of water chlorination
Total Organic Halides*	µg/L	NS	NS	245 (110–350)	101 (54–158)	Byproduct of water chlorination